## PART B. BACKGROUND INFORMATION

### B.1 Scope of Waters in the Integrated Report

***State Overview***

Montana is the fourth largest State in the Union with 145,552 square miles of land area. Its population of 902,195 produces a sparse population density of 6.2 persons per square mile.[16] Populations, and population growth, are concentrated in the valleys of the western and southwestern portion of the State. During the 1990s, Montana's population increased by 12.9%.[17]

Montana contains headwater streams of the Clark Fork-Pend Oreille-Columbia, Missouri-Yellowstone-Mississippi, and St. Mary-Saskatchewan-Nelson watersheds. For administrative purposes, the Montana Department of Environmental Quality (DEQ) has grouped the State's 16 sub-major basins into four administrative basins (Figure 1):

1. Columbia – all Montana's west-draining waters, including the Clark Fork, Flathead, and Kootenai Rivers.
2. Upper Missouri – the Missouri River drainage downstream to the confluence with the Marias River.
3. Lower Missouri – the remaining Missouri River drainage in the State, including the Marias, Musselshell, and Milk rivers. The Montana headwaters of the St. Mary drainage are also included in this basin.
4. Yellowstone – all waters of the Yellowstone River in Montana. Waters of the Little Missouri drainage in southeast Montana are also included.

Efforts to improve the accuracy of the inventory of waters of the United States have been continuing for a number of years. The United States Geological Survey (USGS) and Environmental Protection Agency (EPA), with assistance from other federal and State entities, produced the River Reach File (RF) and then, in the last few of years, the National Hydrography Dataset (NHD). The NHD is the source of the stream and lake size estimates used in this report. Because the primary data source used to develop the RF3 and NHD were USGS topographical maps produced over a period of decades, the coverage detail and accuracy varies across the State. The consistency and accuracy of the coverage for perennial streams and the larger lakes is good, but there is variability with respect to ephemeral and intermittent streams and the small ponds and wetlands. Fortunately, the perennial streams and the larger lakes and reservoirs are the focus of water quality issues and management in the State. Montana's water quality assessment effort concentrates on these larger waterbodies unless specific factors, such as the presence of likely causes of pollution, draws attention to particular intermittent or ephemeral streams or to individual ponds or wetlands.

The total size estimates for streams are 49,643, 117,065, and 7,094 miles for perennial streams, intermittent streams, and ditches and canals, respectively (Table 1). Similarly, the total size estimate for lakes, reservoirs, and wetlands is 691,826 acres (Table 1). The lengths shown for streams, ditches, and canals include all linear waters in the NHD. The size estimates for perennial streams, ditches and canals are good estimates, while those for intermittent and ephemeral streams are more tenuous. Review of the various dataset editions intended to list all lakes, reservoirs, ponds, and wetlands in the State revealed substantial variation in their waterbody number and total size estimates. For this reason, named waters having an area of at least 5 acres form the basis of the size estimates presented in the table.

[16] DP-1. Profile of General Demographic Characteristics: 2000 for the State of Montana [online database]. Washington, DC: Census Bureau (US), US Fact Finder. 2000. Available from: http://factfinder.census.gov/servlet/QTTable?_bm=y&-geo_id=04000US30&-qr_name=DEC_2000_SF1_U_DP1&-ds_name=DEC_2000_SF1_U&-redoLog=false. Accessed 2005 March 3.
[17] Ibid.

**Table 1. Montana Surface Waters**

| RIVER BASINS | Perennial Streams (Miles) | Intermittent & Ephemeral Streams (Miles) | Ditches & Canals (Miles) | Lakes, Reservoirs & Wetlands* (Acres) |
|---|---|---|---|---|
| Columbia | 16,997 | 12,522 | 1,022 | 226,986 |
| Upper Missouri | 14,603 | 17,858 | 2,504 | 101,613 |
| Lower Missouri | 8,872 | 47,713 | 1,637 | 344,163 |
| Yellowstone | 9,171 | 38,972 | 1,951 | 22,064 |
| **Montana Total** | **49,643** | **117,065** | **7,094** | **691,826** |

* Named Waters at least 5 acres in area. Size estimates of all waters derived by DEQ staff from 1:100,000 scale NHD.

The State of Montana's water quality management program does not have authority over all of the waters in Table 1. The EPA is responsible for developing Total Maximum Daily Loads (TMDLs) for all waters located entirely within Indian Reservations. In addition, waters that are within National Parks and Wilderness Areas are not subject to State management activities. For that reason, subtracting those waters from the totals presented in Table 1 provides a clearer picture of the waters that the Montana water quality management program has as its primary focus (Table 2). However, with the sole exception of waters on Tribal lands, the Montana water quality management program takes a direct and vested interest in the quality of all waters in the State.

**Table 2. State Waters Exclusive of Tribal Lands, National Parks, and Wilderness Areas**

| RIVER BASINS | Perennial Streams (Miles) | Intermittent & Ephemeral Streams (Miles) | Ditches & Canals (Miles) | Lakes, Reservoirs & Wetlands* (Acres) |
|---|---|---|---|---|
| Columbia | 13,389 | 977 | 548 | 193,449 |
| Upper Missouri | 13,686 | 17,532 | 2,504 | 100,185 |
| Lower Missouri | 6,973 | 41,999 | 1,223 | 318,904 |
| Yellowstone | 6,778 | 35,342 | 1,812 | 26,928 |
| **Montana Total** | **40,826** | **95,850** | **6,087** | **639,466** |

* Named Waters at least 5 acres in area. Size estimates of all waters derived by DEQ staff from 1:100,000 scale NHD.

***Ecoregions***

Ecoregions are geographic areas that have similar ecosystems and type, quality, and quantity of natural resources.[18] They provide a spatial framework for the research, assessment, management, and monitoring of ecosystems and their components. Montana has seven major ecoregions designated as the: Northern Rockies, Idaho Batholith, Middle Rockies, Wyoming Basin, Canadian Rockies, Northwestern Glaciated Plains, and Northwestern Great Plains (Figure 2). The Northwestern Glaciated Plains and Northwestern Great Plains ecoregions characterize the eastern portion of the State. These give way to the Canadian Rockies region along the Rocky Mountain Front. The western third of the State lies within the Idaho Batholith, Middle, and Northern Rocky Mountain ecoregions. Each ecoregion has a general description of its climate, land surface, natural vegetation, and land use (Table 3)[19,20,21].

[18] 2002. Primary Distinguishing Characteristics of Level III Ecoregions of the Continental United States (April 2002 DRAFT). Available from: ftp://ftp.epa.gov/wed/ecoregions/us/useco_desc.doc. Accessed 2005 April 1, 2005.
[19] Woods, Alan J., Omernik, James, M., Nesser, John A., Shelden, J., and Azevedo, Sandra H., 1999, Ecoregions of Montana (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,500,000).
[20] Ecoregions Descriptions. (n.d.). Available from: http://nhp.nris.state.mt.us/Community/Eco_sections_describe.htm. Accessed 2005 April 1, 2005.
[21] Ecoregions. (n.d.). Available from: http://www.fs.fed.us/land/pubs/ecoregions/toc.html. Accessed 2005 April 1.

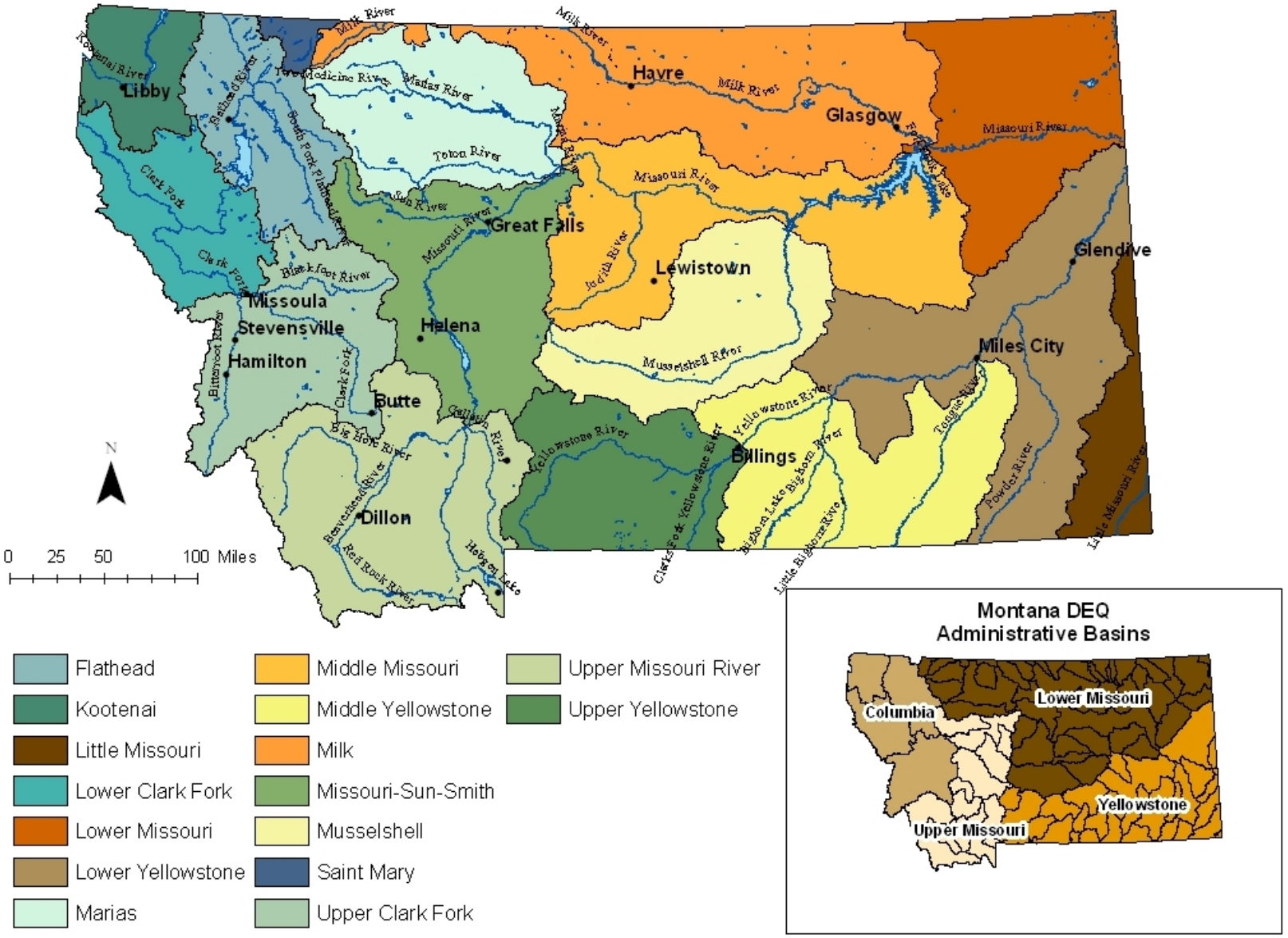


**Figure 1. Montana's Major Drainage Basins and Montana DEQ Administrative Basins**

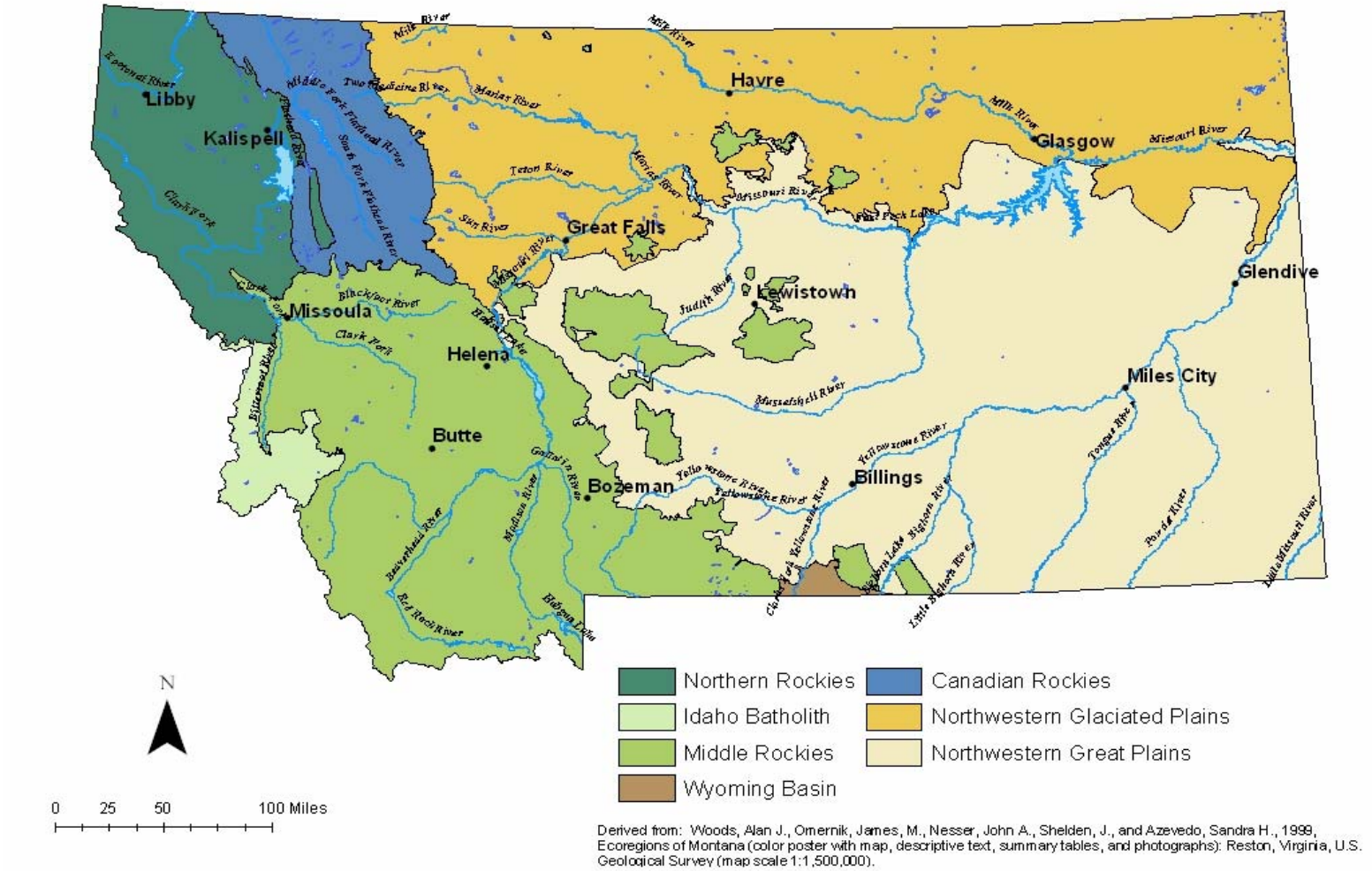


**Figure 2. Ecoregions of Montana**

**Table 3. Characteristics of Montana's Ecoregions**[22,23,24]

| Ecoregion | | Climate | Land Surface | Natural Vegetation | Land Use |
|---|---|---|---|---|---|
| 15 | Northern Rockies | Precipitation ranges from 16 to over 100 in; most of the precipitation in fall, winter, and spring is snow. Climate is cool and temperate with minor maritime influence; summers are dry. Temperature ranges for January and July vary from 8 to 30 °F and 44 to 90 °F, respectively. The growing season ranges from 30-115 days (frost-free days). | There are steep glaciated overthrust mountains with sharp alpine ridges and cirques at higher elevations. Some areas of glacial deposition also occur. Elevation generally ranges from 3,000 to 9,500 ft. Some alpine areas range from 8,000 to 10,000 ft. | Douglas fir, subalpine fir, Englemann spruce, and ponderosa pine and Pacific indicators such as western red cedar, western hemlock, and grand fir are found in the ecoregion. | Land uses include: Logging, mining (e.g., copper, zinc, lead, silver, gold, and tungsten), watershed, recreation, and wildlife habitat. |
| 16 | Idaho Batholith | Precipitation ranges from 20 to 80 in. Most occurs during fall, winter, and spring as snow. Storms are cyclonic from the Pacific Ocean. Climate is maritime-influenced, cool temperate with dry summers. Temperature ranges for January and July vary from 0 to 36 °F and 40 to 88 °F, respectively. The growing season lasts 30 to 150 days (frost-free days). | Partially glaciated, mountainous plateau. Many perennial streams originate here and water quality can be high if basins are undisturbed. Deeply weathered, acidic, intrusive igneous rock is common and is far more extensive than in the Northern Rockies or the Middle Rockies. Soils are sensitive to disturbance especially when stabilizing vegetation is removed. | Grand fir, Douglas fir and, at higher elevations, Engelmann spruce, and subalpine fir occur; ponderosa pine, shrubs, and grasses grow in very deep canyons. | Land uses include logging, grazing, and recreation. Mining and related damage to aquatic habitat was widespread. |
| 17 | Middle Rockies | The climate of the Middle Rockies lacks the strong maritime influence of the Northern Rockies. Precipitation varies widely from 12 to 100 in. Temperature ranges for January and July vary from 0 to 34 °F and 38 to 90 °F, respectively. The growing season lasts 15 to 115 days (frost-free days). | Mountains, foothills, and intermontane valleys. Elevation ranges from 3300 to 12,800 feet. | Mountains have Douglas fir, subalpine fir, and Engelmann spruce forests and alpine areas; Pacific tree species are never dominant. Forests can be open. Foothills are partly wooded or shrub- and grass-covered. Intermontane valleys are grass- and/or shrub-covered and contain a mosaic of terrestrial and aquatic fauna that is distinct from the nearby mountains. | Recreation, logging, mining, and summer livestock grazing are common land uses. |

[22] Woods, Alan J., Omernik, James, M., Nesser, John A., Shelden, J., and Azevedo, Sandra H., 1999, Ecoregions of Montana (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,500,000).
[23] Ecoregions Descriptions. (n.d.). Available from: http://nhp.nris.state.mt.us/Community/Eco_sections_describe.htm. Accessed 2005 April 1, 2005.
[24] Ecoregions. (n.d.). Available from: http://www.fs.fed.us/land/pubs/ecoregions/toc.html. Accessed 2005 April 1.

| Ecoregion | | Climate | Land Surface | Natural Vegetation | Land Use |
|---|---|---|---|---|---|
| 18 | Wyoming Basin | Precipitation ranges from 6 to 12 in per year. Temperature ranges for January and July vary from 12 to 34 °F and 54 to 90 °F, respectively. The growing season lasts 100 to 130 days (frost-free days). | Plains with hills or low mountains. Elevation ranges from 3700 to 5200 feet. | Potential vegetation includes: sagebrush, wheatgrass, needlegrass, saltbush, greasewood, juniper, and pinyon. | Much of the region is used for livestock grazing, although many areas lack sufficient vegetation to support this activity. The region contains major producing natural gas and petroleum fields. |
| 41 | Canadian Rockies | Precipitation ranges from 20 to 100+ in per year. Temperature ranges for January and July vary from 12 to 34 °F and 54 to 90 °F, respectively. The growing season lasts 25 to 70 days. | The region is generally higher and more ice-covered than the Northern Rockies. The elevation of the Canadian Rockies varies from 3500 to 10,500 feet. | Vegetation is mostly Douglas fir, Englemann spruce and subalpine fir. The higher elevations are treeless alpine. | A large part of the region is in national parks where tourism is the major land use. Forestry and mining occur on the non-Park lands. |
| 42 | Northwestern Glaciated Plains | Precipitation averages 10 to 15 in, with maximum occurring in spring and early summer. Winters are extremely, cold with desiccating winds and snow. Climate is cold continental, with dry winters and warm summers. Temperature averages 37 to 45 °F. The growing season lasts 100 to 130 days (frost-free days). | This region includes level to gently rolling continental glacial till plains and rolling hills on the Missouri Plateau. Steep slopes border some of the larger rivers. Elevation ranges from 2,500 to 5,000 ft. This Section is within the Great Plains physiographic province. | Kocher mapped vegetation as grama-needlegrass-wheatgrass. Common species include blue grama, blue bunch wheatgrass, green needlegrass, needle-and-thread, western wheatgrass, and basin wild rye. | Most of the area is in cropland or is grazed by livestock. |
| 43 | Northwestern Great Plains | Precipitation ranges from 10 to 20 in, with more than half falling during the growing season. Winters are extremely cold with desiccating winds. Precipitation is snow. Climate is cold continental. Temperature averages 37 to 48 °F. The growing season lasts 110 to 160 days (frost-free days). | Rolling shale and sandstone plains, punctuated by occasional buttes. Elevation ranges from 1500 to 3900 feet. | Grasslands primarily persist in rangelands with broke topography. Native grasses largely replaced by spring wheat and alfalfa on level ground. | Dry land farming and livestock grazing occur on about 85 percent of the area. Some commercial timber harvests also occur. |

***Descriptions of Surface Waters***

**Streams**

Streams are separated into three general categories depending on their relative position of their stream bed to the local shallow groundwater table and flow characteristics.

1. Ephemeral streambeds are always above the local shallow groundwater and flow only in response to snowmelt or rainfall. Such streams are dry most of the year and are in the semi-arid and mountain headwater regions of Montana.
2. Intermittent streambeds are below the local shallow groundwater table during part of the year and flow in response to groundwater recharge and precipitation. Most of the stream miles in Montana are small (first and second order) ephemeral or intermittent streams.
3. Perennial streambeds are always below the local shallow groundwater table and typically have surface flow throughout the year.

A stream ordering technique, like that described by Strahler (1957),[25] can be used to categorize any stream reach by the relative size of the contributing watershed. First order streams do not have tributaries and are commonly ephemeral or intermittent. The order of a stream changes at the confluence of two like order streams (i.e., a second order stream begins at the confluence of two first order streams, a third order stream begins at the confluence of two second order streams, and so on).

**Lakes**

All lakes and reservoirs are part of the State's water resources, but most of the assessment emphasis has been focused on "significant publicly owned" lakes. These lakes have public access and recreation potential. Unfortunately, the NHD does not identify those lakes. Therefore, for this report, the DEQ considers named perennial lakes greater than or equal to five acres as significant publicly owned lakes.

This subset of the total lake acreage may contain private reservoirs or may exclude some small alpine or pothole lakes on public lands. Until resources are available to undertake a State-wide lakes ownership survey, DEQ will identify "significant, publicly owned" lakes for section 305(b) reporting as described above.

**Wetlands**

Recent monitoring and assessment of more than 80 wetlands throughout the State indicates that wetlands are far more diverse than anticipated. Montana's wetland water chemistry varies from water with very low dissolved solids, similar to high mountain streams and lakes, to those with marine-quality water chemistry. The amount of water associated with wetlands is equally varied. Some have large open-water areas, while others are wet meadows.

On a broad scale, wetlands can be divided into three categories: little or no open water; open water is prevalent; and riverine. Water chemistry, vegetation, connection to groundwater, presence of an inlet, outlet, or both, and persistence of wetness can vary widely within each category.

At this time, accurate maps do not exist for Montana's wetlands as they do for streams and lakes. As a result, only estimates of their aerial extents exist (Table 1).

**B.2 Water Pollution Control Program**

***Water Quality Standards***

The Water Quality Standards Section is primarily responsible for updating, modifying, and developing state water quality standards and classifications through rulemaking. In addition to updating or adopting standards that are developed by EPA at the national level, the section is actively working on scientific studies to develop standards that

[25] Strahler, A.N. Quantitative analysis of watershed geomorphology. Amer. Geophys. Union Trans. 1957; 38:913 920.

naturally vary as a function of local conditions (e.g., nutrient standards). However, the section does not have the authority to give final approval to changes in water quality standards and classifications. This authority lies with the Board of Environmental Review (BER), which is the final state authorizing authority on standards rulemaking. Generally, a complete review of standards occurs every three years, but changes to the standards can occur at any time as needed. During legislative sessions, the section is frequently called upon to provide comment on proposed changes to the Montana Water Quality Act.

The section is responsible for the state's water quality certification (401certification) of hydro facilities that require a license from the Federal Energy Regulatory Commission (FERC). In addition to new FERC licenses, the section monitors and reviews activities required of in-place licenses, such as long-term monitoring of water quality below dam sites. The section also provides guidance and interpretation of narrative standards to the Department, as well as to the general public.

**Standards Review and Rulemaking Process**

The DEQ periodically reviews, updates, and modifies Montana's water quality standards as necessary. State law provides the authority to the DEQ and the BER to adopt proposed water quality standards into the Administrative Rules of Montana (ARM). The rulemaking process also involves the Water Pollution Control Advisory Council (WPCAC), the Governor's Office, the EPA, and the public. This summary will cover the public review process for developing water quality standards, and how proposed standards become finalized into rules.

Once a draft rule is developed, DEQ typically starts public review with informal outreach that includes posting the proposed rule on the DEQ website to allow interested persons early involvement. This provides the public and the rulemaking team additional time to become involved and address issues that may arise. Once the Department is satisfied with the draft proposed rule, a copy is sent to the Governor's Office for review and comment.

The rule is then submitted to the WPCAC at least 30 days before the proposed rule is published. Following WPCAC review and potential modification, the proposed rule is presented to the BER.

The BER decides whether to initiate rulemaking on the proposed rule. If BER gives the approval to move ahead, the proposed rule is published in the Administrative Register approximately 14 days after the BER meeting. The date that it appears in the Administrative Register is the official publication date, which starts a 6-month deadline for final adoption by the BER.

Meanwhile, a public hearing is set to occur about 30 days after publication in the Administrative Register. During this time a legal add is run for three consecutive weeks in major newspapers to inform the public of the proposed rule.

The public hearing is held and comments are recorded. The DEQ staff responds to the comments, and any necessary changes to the rule are made. The draft response to comments and any changes to the rule are submitted to the BER. The BER then chooses to adopt, not adopt, or adopt the rule with modification.

Final notices are prepared for the adoption of the rulemaking, and then published in the Montana Administrative Register. A notice of the rule passing is sent to any interested parties.

The Department completes the final rule and forwards it to the Secretary of State. The Department then enters the final rule on the website. The new rule takes effect under state law when it is published in the Montana Administrative Register.

Finally, Montana submits the standards change to EPA for approval. Following EPA approval the new standard becomes effective under the Federal Clean Water Act.

**Numeric and Narrative Standards**

Montana water quality standards include both use-specific components and general provisions. Standards may be either narrative or numeric, and be specific to human health, aquatic life or for beneficial uses such as agriculture. Some numeric water quality standards can be classified in terms such as "acute" or "chronic."

Narrative standards provide a minimum level of protection to state waters and may be used to limit the discharge of pollutants, or the concentration of pollutants in waters not covered under numeric standards. Montana narrative water quality standards prohibit activities which would result in nuisance aquatic life (ARM 17.30.637). Some standards, such as pH, temperature, and sediment, are defined in terms of change from what would naturally exist. These standards provide that "no increase above naturally occurring condition" shall occur.

Montana's numeric water quality standards published in DEQ-7 were developed using guidance from the EPA. EPA's guidance for water quality criteria include: human health advisories, National Recommended Water Quality Criteria (NRWQC), and drinking water criteria referred to as Maximum Contaminant Levels (MCL). Examples of numeric water standards include the electrical conductivity standards and the numeric standards for nutrients.

**Circular DEQ-7**

The name of the Circular WQB-7 was changed to Circular DEQ-7. The Circular contains numeric water quality standards for Montana's surface and groundwaters. The standards were developed in compliance with Section 75-5-301, MCA of the Montana Water Quality Act and Section 303(c) of the Federal Clean Water Act (CWA). Together, those provisions of state and federal law require the adoption of standards that will protect the designated beneficial uses of state waters, such as the support of aquatic life, public water supplies, recreation, or agriculture.

The numeric water quality standards in the Circular have been established for parameters (i.e., "pollutants") that are categorized as toxic, carcinogenic, bioconcentrating, radioactive, nutrient, or harmful. In addition, the Circular contains groundwater standards for pesticides developed in compliance with the Montana Agricultural Chemical Ground Water Protection Act (80-15-201, MCA).

In addition to providing the numeric water quality standards for each parameter, the Circular also contains the primary synonyms of each parameter, the Chemical Abstracts Service Registry Number (CASRN) for each chemical, the categorization of each parameter according to the type of pollutant, the bioconcentration factor if known, trigger values used to determine "significance" under Montana's nondegradation policy, and required reporting values.

Standards have been revised for various substances to reflect current EPA 304(a) criteria. Human health standards have now been changed from fecal coliform to *E. coli*. Also, the Circular was revised to reflect the State's current human health standard for arsenic from 18 to 10 µg/L.

**Montana Water Classification System**

Montana waterbodies are classified according to the present and future beneficial uses that they should be capable of supporting (75-5-301 MCA). The state Water-Use Classification System (ARM 17.30.604-629) identifies the following beneficial uses:

- Drinking, culinary use, and food processing
- Aquatic life support for fishes and associated aquatic life, waterfowl, and furbearers
- Bathing, swimming, recreation, and aesthetics
- Agriculture water supply
- Industrial water supply

**Surface Water Classification System**

Montana's surface water use classification system employs categories which are based primarily on water temperature, fish, and associated aquatic life (Table 4). Each of the classes has associated beneficial uses (Table 5). The three most common categories are A, B and C. The "I" classification is another category, but it is seldom used, and only three streams in Montana are listed with this classification. Four additional water categories were added to the classification system in August 2003; D, E, F, and G. These categories are for ephemeral streams, seasonal, and semi-permanent lakes, ponds and ditches.

**Table 4. Surface Water Classification**

| Classification | Description |
|---|---|
| A-CLOSED | Waters classified A-Closed, are suitable for drinking, culinary and food processing purposes after simple disinfection. |
| A-1 | Waters classified A-1, are suitable for drinking, culinary and food processing purposes after conventional treatment for removal of naturally present impurities. |
| B-1 | Waters classified B-1, are suitable for drinking, culinary and food processing purposes after conventional treatment; bathing, swimming and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply. |
| B-2 | Waters classified B-2, are suitable for drinking, culinary and food processing purposes after conventional treatment; bathing, swimming and recreation; growth and marginal propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply. |
| B-3 | Waters classified B-3, are suitable for drinking, culinary and food processing purposes after conventional treatment; bathing, swimming and recreation; growth and propagation of non-salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply. |
| C-1 | Waters classified C-1, are suitable for bathing, swimming and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply. |
| C-2 | Waters classified C-2, are suitable for bathing, swimming and recreation; growth and marginal propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply. |
| C-3 | Waters classified C-3, are suitable for bathing, swimming and recreation; growth and propagation of non-salmonid fishes and associated aquatic life, waterfowl, and furbearers. The quality of these waters is naturally marginal for drinking, culinary and food processing purposes, agriculture, and industrial water supply. Degradation which will impact existing or established uses is not allowed. |
| I | The goal of the State of Montana is to have these waters fully support the following uses: drinking, culinary and food processing purposes after conventional treatment; bathing, swimming and recreation; growth and propagation of fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply. |

**Table 5. Designated beneficial uses by waterbody class**

| Beneficial Uses | Water Use Classification | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | A-Closed | A-1 | B-1 | B-2 | B-3 | C-1 | C-2 | C-3 |
| Aquatic Life | X | X | X | X | X | X | X | X |
| Fisheries (Salmonid) | X | X | X | X | | X | X | |
| Fisheries (Non-Salmonid) | | | | | X | | | X |

| Beneficial Uses | Water Use Classification | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | A-Closed | A-1 | B-1 | B-2 | B-3 | C-1 | C-2 | C-3 |
| Agriculture | X | X | X | X | X | X | X | M |
| Industry | X | X | X | X | X | X | X | M |
| Drinking Water (Human Health) | X | X | X | X | X | | | M |
| Recreation | X | X | X | X | X | X | X | X |

X = Beneficial use
M= Marginal Use (may exist)

A waterbody is considered to support its beneficial uses when it meets the water quality standards established to protect those uses. A waterbody is considered to be impaired when there is a violation of the water quality standards established to protect any of the applicable beneficial uses. In some cases the violation of a standard will result in the impairment of only a single use; in other situations the violation of one or more standards may result in the impairment of all uses for the applicable classification

The A-Closed and A-1 waters are high quality, and the principal beneficial use is public water supply. A-Closed classification may authorize watershed protection and use restrictions to protect the drinking water use.

Montana divides B and C classifications based on cold-water or warm-water aquatic life. B- (1 or 2) and C- (1 or 2) support cold-water aquatic life, while B-3 and C-3 waterbody classes support warm water aquatic life. B and C waters have identical use classifications, except that B waters include drinking water as a beneficial use, and C waters do not. The B- (1, 2 and 3) classifications are multiple use waters suitable for domestic use after conventional treatment, growth and propagation of fish (cold water, B-1 and B-2, warm water, B-3), associated aquatic life and wildlife, and agricultural and industrial uses. Most streams in Montana have a B- (1, 2, or 3) classification.

Four stream segments listed here are intended to be B-1 waters but due to existing degradation at the time of Use Classification they were not meeting B-1 standards and are therefore classified as C-1 or C-2:

1. Rainy Creek (C-1), Mainstem from the W.R. Grace Company water supply intake to the Kootenai River
2. Clark Fork River (C-2), from Warm Springs Creek to Cottonwood Creek
3. Clark Fork River (C-1), from Cottonwood Creek to the Little Blackfoot River
4. Ashley Creek (C-2), Mainstem from bridge crossing on airport road to the Flathead River

C-3 streams are suitable for warm water (non-salmonid) fisheries and associated aquatic life, and recreation activities. Because these streams often contain naturally high total dissolved solids (salinity), their quality is marginal for drinking water, agricultural and industrial uses.

Streams with an “I” classification were impacted by an activity which would not allow the stream to fully support drinking, recreation or fishery uses at the time the first stream classifications were determined (1955). The State's goal is to improve the quality of these waterbodies so that they will fully support all appropriate beneficial uses.

There are three stream segments, in Montana, designated as I – class waters:

1. Prickly Pear Creek below East Helena (Upper Missouri Basin)
2. Silver Bow Creek (Upper Clark Fork Basin)
3. Muddy Creek (Sun River Basin).

Lastly, effective August 2003, four additional water categories were added to the classification system; D, E, F, and G. No waters are currently placed in these classifications; rather they are placeholders for future use. The categories include ephemeral stream classes (E-1 and E-2); ditch classes (D-1 and D-2); seasonal or semi-permanent

lake and pond classes (E-3, E-4 and E-5; and one low or sporadic flow class (F-1). Waters classified G-1 are to be maintained suitable for watering wildlife and livestock, aquatic life not including fish, secondary contact recreation, and marginally suitable for irrigation after treatment or with mitigation measures. Hold water that is produced from coal bed methane development are classified as G-1 waters.

**Groundwater Classification System**

Montana classifies its groundwater according to the actual quality and use as of October 1982. The classifications are I, II, III, and IV.

- Class I - groundwater has a specific conductance less than 1,000 µSiemens/cm at 25°C and is suitable for public and private water supplies, food processing, irrigation, drinking water for livestock and wildlife, and commercial and industrial purposes, with little or no treatment required.

- Class II - groundwater has a specific conductance range of 1,000 to 2,500 µSiemens/cm at 25°C and may be used for public and private water supplies where better quality water is not available. The primary use of Class II groundwater is for irrigation, stock water, and industrial purposes.

- Class III - groundwater has a specific conductance range of 2,500 to 15,000 µSiemens/cm at 25°C. Its primary use is for stock water and industrial purposes. It is also marginally suitable for some salt tolerant crops.

- Class IV - groundwater has a specific conductance greater than 15,000 µSiemens/cm at 25°C. Class IV groundwater is used primarily for industrial purposes.

**Designated Uses and Use Support**

Montana classified its waterbodies in the 1950's according to existing and future beneficial uses that they should be capable of supporting (75-5-301 MCA). The State Water-Use Classification System (ARM 17.30.606-629) identifies the following beneficial uses:

- Drinking, culinary use, and food processing
- Aquatic life support for fish and associated aquatic life, waterfowl, and furbearers
- Bathing, swimming, and recreation
- Agriculture water supply
- Industrial water supply

Aquatic life, fisheries, recreation, and drinking water, culinary and food processing are designated uses that have the highest water quality requirements. When a waterbody supports these beneficial uses, a waterbody should support all other existing and future designated uses (i.e., agricultural and industrial).

**Aquatic Life**

Aquatic life support is a broad use descriptor intended to protect fish and other aquatic animals and plants normally associated with a high quality ecosystem. Chemical pollutants, sediment, temperature modification, riparian habitat degradation, stream channel modifications, excessive water withdrawal, irrigation return flows, and other actions that disrupt the biological integrity of the waterbody can impair aquatic life.

**Fisheries**

In Montana, fisheries consist of cold (salmonid) and warm water (non-salmonid) fisheries. Mountain or foothill streams and lakes typically support cold-water fisheries such as trout and associated game and non-game fish. The eastern prairie streams and lakes and the lower Missouri and Yellowstone rivers typically support warm water fisheries. These waterbodies are naturally warm and have higher suspended sediment and total dissolved solids. They typically support sauger, catfish, and a wide variety of non-game fish. Fisheries fall under the more general aquatic life support use. The State considers a water that has a fisheries impairment, also has an aquatic life impairment.

**Recreation**

Recreation includes primary and secondary contact recreation. Swimming and wading are examples of primary contact recreation, while boating is a type of secondary contact recreation. Noxious algae growth or health concerns such as fecal coliform or *E. coli* bacteria can impair the use of a waterbody for swimming.

**Drinking Water, Culinary and Food Processing**

Water is suitable for drinking if it falls below MCL for all health-threatening contaminants. The MCL for a pollutant is the maximum concentration that EPA has found to be safe for human consumption. The EPA derived MCL numbers from cancer and toxicity studies, and the availability of technology to treat the water before consumption to reduce or remove contaminants.

Human health criteria refer to the concentration of a carcinogen such as arsenic or a pesticide that correlated to a specific level of increased cancer risk resulting from life-long exposure to the carcinogen through drinking the contaminated water and/or consuming fish from the same waters. The Montana Legislature has legislated the acceptable risk level to be one case of cancer per 100,000 persons exposed for all carcinogens except arsenic, for which the acceptable level is one cancer per 1,000 persons exposed (MCA 75-5-301(2)(b)).

**Agriculture and Industry**

Generally, if a waterbody supports drinking water, culinary and food processing, recreation, and aquatic life beneficial uses then the State assumes it will also support agricultural and industrial beneficial uses. However, additional salinity and toxicity information may be required for agriculture use-support determinations.

All Montana use classifications support multiple uses. Therefore, the level to which water quality supports each designated use must be assessed. The beneficial use support decision for each use is independent of the other designated uses (e.g., a waterbody may partially support aquatic life because of excess nutrients, not support drinking water because of arsenic, but fully support agriculture and industrial uses).

**Reference Condition**

Identifying reference sites is an outgrowth of the reference condition concept. The reference condition concept asserts that there exist for any group of waterbodies relatively undisturbed examples that can represent the natural biological, physical, and chemical integrity of a region; therefore, reference stream sites are those that represent the reference condition. The DEQ is interested in reference sites because they help the Department interpret narrative water-quality standards. A number of Montana's narrative standards require that water quality be compared to "naturally occurring", and the DEQ uses reference sites to help interpret what naturally occurring is.

In 2000, DEQ re-initiated a Reference Stream Project and began to collect data at existing reference sites as well as at new sites that were identified around the state.[26] In addition to conducting field sampling, in 2004 the DEQ began to assemble a comprehensive list of potential reference stream sites and their associated data. This list included not only the sites from the DEQ Reference Stream Project, but also sites from a variety of other statewide water-quality sampling projects (e.g., the USGS Hydrologic Benchmark Network).

An evaluation process was developed and used to assess each candidate reference site in a consistent way. (Some established reference sites that had already been thoroughly reviewed using similar techniques did not go through this process, and were automatically classified as final reference sites.) The process consisted of performing quantitative watershed and water-quality analyses for each site, as well as qualitative assessments of stream health and condition using a set of criteria and best professional judgment (BPJ). Each quantitative analysis or BPJ criterion evaluated some aspect of stream or watershed condition that could potentially impact water quality and aquatic life. Sixteen BPJ criteria (e.g., bank erosion, sediment deposition, grazing impacts) were tailored for cold-water streams (mountainous regions), and were slightly different from thirteen BPJ criteria tailored for warm-water streams (prairie regions). A series of seven tests, or "screens," was then used to create the final list of reference sites. The screens were constructed from the qualitative BPJ assessments and also from numeric values identified as impact thresholds in the quantitative analyses, and addressed factors operating at the watershed-scale, site-specific scale and, in many cases, both. The seven screening tests were: cumulative impacts from multiple causes; site-

[26] Ibid.

specific data sufficiency; impacts from land-use based on the proportion of agriculture; numeric water-quality standards exceedences for heavy metals; impacts from mines; road density; and timber-harvest intensity (the later two applicable to cold-water streams only). To make the final list, a site had to pass each applicable screen. Sites that passed all applicable screens were considered general-purpose reference sites, since their condition was not found to be impacted for any categories.

Using the process described above, a group of Montana reference stream sites has been identified. However, there remains the need to assure that the reference sites are sufficiently similar to the stream sites against which they are compared. In general, Omernik level-III ecoregions have shown themselves to be an excellent tool for the initial partitioning of Montana reference streams.[27] However, in certain cases more specific geospatial characteristics than level III ecoregions alone may need to be determined for the reference site and the comparison site. What those geospatial characteristics will be varies according to the parameter of interest. For example, elevation is important when considering aquatic insect (macroinvertebrate) populations, watershed area is important when considering prairie stream fish populations, and nutrient concentrations are best explained by level IV (fine-scale) ecoregions. It is likely that some water quality parameters and biological assessment metrics can be "referenced" at a fairly coarse scale (e.g. level III ecoregions), while others cannot. The reader should refer to specific reports (many cited in this report) and their associated stream assessment "tools" to decide how to best apply the reference sites provided here. And there are limitations to the use of the reference stream data. Most of the sites are located in lower Strahler stream orders — mainly 1st through 4th but including a few 5th order sites — and the data are most applicable to streams of that size range (the so-called "wadeable" streams). Therefore, the extension of these data to sites from much larger waterbodies (e.g., Yellowstone River, 6th order) should be undertaken with caution.

***Point Source Control Programs***

Montana's Point Source Program (PS) was established as a result of the 1972 amendments to the CWA that established the National Pollutant Discharge Elimination System (NPDES) authorizing EPA to issue discharge permits and to delegate to States "many of the permitting, administrative, and enforcement aspects of the NPDES program."[28] The goal of the NPDES program was to control point source pollutant discharges and subsequently protect water quality in the nation's waters. Point sources as defined in 40CFR, Part 122 include the following: concentrated animal feeding operations as defined in §122.23; concentrated aquatic animal production facilities as defined in §122.24; discharges into aquaculture projects as in §122.25; discharges of stormwater as set forth in §122.26; and silvicultural PS as defined in §122.27. In 1974, 1981, and 1983, EPA authorized the state to implement the NPDES Program, regulate federal facilities, and the General Permits Program, respectively.[29] Currently these duties are the responsibility of DEQ and Water Protection Bureau.

As of 2005, DEQ is backlogged on permit issuance. A summary of permit issuance status for the state of Montana is shown in Table 6.

**Table 6. Permit Status Report for Major and Minor Facilities Covered by General Non-Stormwater Permits[30]**

| | Issuance Goal | Actual for August 2005 | | | Permit Deficit |
|---|---|---|---|---|---|
| | | Total Facilities | Current Facilities | Current % | |
| MT | 90% | 379 | 222 | 58.6% | 119 |
| MT (EPA)* | 90% | 17 | 17 | 100% | 0 |

*Indicates EPA is the permitting authority

[27] Omernik, J. M. 2000. Level III ecoregions of the continental United States (map). Revised November 2000. National Health and Environmental Effects Research Laboratory, U.S. Environmental Protection Agency, Corvallis, OR.

[28] 2005. *Clean Water Act - National Pollutant Discharge Elimination System (NPDES)* [online document] (United States Environmental Protection Agency. Available from: http://cfpub1.epa.gov/npdes/cwa.cfm?program_id=45. Accessed 2005 August 24.

[29] 2005. *NPDES Permit Program Results for Montana* [online document] (United States Environmental Protection Agency, [cited 08/24/05]) Available atcfpub.epa.gov/npdes/stateinfo.cfm?&view=state&state_id=27&state=MT.

[30] 2005. Personal Communication. Association of State and Interstate Water Pollution Control Administrators (ASIWPCA), Washington D.C. 20002.

**Discharge Permit System Program**

The goal of the Montana Pollutant Discharge Elimination system (MPDES) program is to control point source discharges of wastewater and subsequently protect water quality in receiving streams. The State's Water Quality Standards (WQS) establish the levels of water quality required to maintain the designated beneficial uses of the receiving streams[31,32].

All point sources of wastewater discharge are required to obtain and comply with MPDES permits. The effluent limitations and other conditions contained in MPDES permits are based upon preservation of the WQS, with certain categories of wastewaters requiring treatment to a federally-specified minimum level (technology-based treatment) in addition to WQS requirements. The State calculates WQS requirements for pollutant levels in the discharge at the average design wastewater flow and the seven-day, ten-year low stream flow (7Q10) in the receiving stream. At streamflows below the 7Q10, the WQS and MPDES do not give further protection from pollutant discharges.

The Nondegradation Rules are a part of the WQS that apply to new or increased sources of pollution. These rules prohibit increases in the discharge of toxic and deleterious materials to state waters, unless a permit applicant demonstrates to the DEQ that a change is justifiable because of necessary economic or social development, and that it will not preclude present and anticipated use of these waters.

Some common pollutants that are limited under Nondegradation are nutrients, heavy metals, and toxic organic pollutants. These same pollutants could also be limited under the WQS in existing discharger's permits. The difference would be that the WQS levels would be calculated to achieve less than chronic toxicity levels instream at the 7Q10, whereas nondegradation limits in new or enlarged point source discharges would be set at baseline instream concentrations plus a "trigger level" amount which would define the "significance" threshold.

Each MPDES permit issued is designed to protect the receiving stream quality at the point of discharge. In addition, recognizing the dynamic nature of streams and the potential additive or cumulative effects of pollutants, MPDES permits also address stream reach or basin-wide pollution problems. A calculation process called TMDL is used to apportion allowable pollutant discharge levels among the various dischargers. If the State finds that reductions of a given pollutant in a stream reach or basin are necessary to meet WQS, the State uses the TMDL to apportion the reductions among the dischargers in that reach or basin.

Application and annual permit fees fund the State's MPDES program. Activities of program staff include public education, reviewing applications, determining effluent limits and best management practices, environmental assessments, public participation and information retrieval, effluent and instream data review and management, field inspections, enforcement, regulation and guidance preparation, program planning and administration.

**Stormwater Program**

Stormwater is defined as stormwater runoff; including snow melt runoff, and surface runoff and drainage. Stormwater runoff may carry high levels of pollutants such as sediment, oil and grease, suspended solids, nutrients, heavy metals, pathogens, toxins, and trash. Industry, mining, construction, municipalities, and other regulated facilities or activities can introduce these pollutants into stormwater and ultimately into state waters potentially threatening the environment or public health.

The DEQ has broad statutory and regulatory authority to address stormwater discharges under the Montana Water Quality Act (75-5-101 et seq. MCA) and the Administrative rules of Montana (17.30, Subchapters 11, 12, and 13). Stormwater discharges, as defined in 17.30.1102, are permitted through the use of MPDES permits. The purpose of the stormwater program is to reduce the amounts of pollutants entering state waters as a result of runoff from residential, commercial, and industrial sources through permit compliance, technical assistance, and training.

[31] Montana Department of Environmental Quality (US) [DEQ]. Montana Numeric Water Quality Standards (DEQ-7) [online document]. Helena, MT: DEQ; 2006 Feb. 40 p. Available from: http://www.DEQ.state.mt.us/wqinfo/Circulars/WQB-7.PDF.

[32] Administrative Rules of Montana. ARM 17.30.606 – 629 (2006)

**Concentrated Animal Feeding Operations (CAFOs)**

Confined livestock can be a source of pollutants to state waters and are, therefore, subject to the provisions of Montana's water quality laws. The Montana Water Quality Act (75-5-101 et seq. MCA) governs the discharge of pollutants to state waters. Section 605 of the Act states that it is unlawful to cause pollution of any state waters, or to place wastes in a location where they will cause pollution (75-5-605 (1) (a) MCA). It is also unlawful to discharge sewage, industrial waste, or other wastes into any state waters without a current permit from the DEQ (75-5-605 (2) (c) MCA). State waters are defined as a body of water, irrigation system, or drainage system, either surface or underground (75-5-103(25) MCA).[33] Surface waters that flow periodically in ephemeral and intermittent channels are also considered state waters. The definition excludes non-discharging, waste containment or treatment ponds and irrigation or land application systems having no return flow to state waters.

Animal feeding operations are regulated by the MPDES permit program administered by the DEQ. An animal feeding operation has both of the following conditions:
Animals are stabled, confined, and fed or maintained for a total of 45 days or more in any 12-month period;
Crops, forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the facility.

Animal feeding operations that discharge, or have the potential to discharge, stormwater or process wastewater to any state water are defined as CAFOs and must obtain a discharge permit from DEQ. A CAFO is defined in the federal code of regulations (40CFR, Part 122, Appendix B) as an animal feeding operation that:

- Contains more than 1,000 animal units;
- Contains between 301 and 1,000 animal units and a discharge occurs through a man-made conveyance; or pollutants are discharged directly into state waters, which originate outside of the facility and pass over, across, or through the facility; or,
- Is designated as a CAFO by DEQ.

An "Animal unit" is calculated by adding the numbers of:

- Slaughter and feeder cattle multiplied by 1.0,
- Mature dairy cattle multiplied by 1.4;
- Swine, weighing 55 pounds or more, multiplied by 0.4
- Sheep multiplied by 0.1;
- Horses multiplied by 2.0.

The DEQ must conduct a site inspection prior to designating an operation with less than 301 animal units as a CAFO and requiring a permit (ARM 17.30.1330(5)). The DEQ must consider details regarding size, runoff volume, distance to surface or groundwater, slope, and ground cover conditions in assessing the likelihood and frequency of a discharge and making a case-by-case designation. Other relevant factors may include proximity to public water supplies, or public complaints. A CAFO operator applies for the permit by completing Short Form B and paying a $600.00 annual application fee. The application form requests information on facility ownership, location, size, physical surroundings, and waste control and land application practices.

**Industrial Pretreatment**

The EPA implements this program. It has not been delegated to the State.

**Bio-solids Program**

The EPA implements this program. It has not been delegated to the State.

***Nonpoint Source Pollution Control Program***

Montana's Nonpoint Source Pollution (NPS) Program was established shortly after Section 319, "Management of Nonpoint Sources of Pollution," was added to the CWA in 1987. Under Section 319, the State receives grant money for supporting a wide variety of activities including technical and financial assistance, education, training,

[33] The term "state waters" serves only to identify what is protected under the law. The term conveys no right of ownership.

technology transfer, demonstration projects, and monitoring to assess the success of specific nonpoint source implementation projects. In order to receive 319 funding the State must complete an assessment report of their nonpoint sources (updated biennially as part of the State's 305(b) report) and develop a management program to address the problems identified in the assessment report.

In May 1996, the EPA provided major new guidance for States in developing their nonpoint source management programs. This guidance required States to reflect nine key elements in their programs.[34] Montana incorporated those nine key elements in its 2001 Nonpoint Source Management Plan. Currently the DEQ is reviewing the existing Plan with intent of updating the document in 2007.

**Nonpoint Source Pollution and Montana**

Nonpoint source pollution is human-induced pollution generated from diffuse sources such as grazing, logging, farming, mining, land development, and many other activities. In 2000, nonpoint source pollution accounted for 90 percent of the stream and 80 percent of the lake impairments in Montana.[35] The current Nonpoint Source Management Plan, approved by EPA in June 2001, ranked the five leading sources of water quality impairments in Montana for rivers and streams, and lakes, based on the 2000 303(d) list, as follows (Table 7):

**Table 7. Top Five Impairment Sources Cited in 2000 (by number of listings)**

| Rank | Rivers and Streams | Lakes |
|---|---|---|
| 1 | Agriculture | Atmospheric Deposition |
| 2 | Hydrologic Modification | Agriculture |
| 3 | Resource Extraction | Resource Extraction |
| 4 | Habitat Modification | Debris and Bottom deposits* |
| 5 | Construction | Hydrologic Modification |

* Debris and bottom deposits are the result of a variety of different human activities related to agriculture, resource extraction, construction, etc. As such, the State addresses debris and bottom deposits in several of its NPS Strategies.

Below is a description of the primary nonpoint sources of pollution within the State of Montana and the State's strategy for mitigation.

**Agriculture & Forestry**

Farms and ranches cover two-thirds of the state – nearly 60 million acres.[36] Thirty percent of this is cropland and sixty-five percent is range and pasture land. Agriculture is Montana's leading industry, generating nearly 2 billion dollars in 2002: ~ $767 million in crops and ~ $1 billion in livestock.[37] In 2000, 2002, and 2004 agricultural activities impaired more than 6,000 miles of streams and approximately 60 percent of assessed impaired streams were impaired by agricultural sources[38,39,40]. In addition, during these reporting cycles, farming and ranching

[34] Environmental Protection Agency (US) [EPA]. Office of Water. Nonpoint Source Program and Grants Guidance for Fiscal Year 1997 and Future Years [online document]. Washington, DC: EPA; 1997. Available from: http://www.epa.gov/owowwtr1/nps/npsguid.html. Accessed 2006 November 14.
[35] Montana Department of Environmental Quality (US) [DEQ]. Water Quality Planning Bureau. 2000 Montana Water Quality Assessment Database [database online]. Helena (MT): DEQ; 2000. Available from: http://www.CWAIC.mt.gov. Accessed 2005 June 30.
[36] 2002 Census of Agriculture - Volume 1 Geographic Area Series Census, US - State Data [online database]. Washington (DC): Department of Agriculture (US), National Agriculture Statistics Service. 2002. Available from: http://www.nass.usda.gov/Census/Create_Census_US.jsp.
[37] *2004 Montana Agricultural Statistics* [online document] (Montana Department of Agriculture, Issn: 1095-7278, Vol. XLI. Available from: http://www.nass.usda.gov/mt/. Accessed 2005 June 30
[38] Montana Department of Environmental Quality (US) [DEQ]. Water Quality Planning Bureau. 2000 Montana Water Quality Assessment Database [database online]. Helena (MT): DEQ; 2000. Available from: http://www.CWAIC.mt.gov. Accessed 2005 June 30.
[39] Montana Department of Environmental Quality (US) [DEQ]. Water Quality Planning Bureau. 2002 Montana Water Quality Assessment Database [database online]. Helena (MT): DEQ; 2000. Available from: http://www.CWAIC.mt.gov. Accessed 2006 November 17.

activities impacted about 300,000 acres of lakes.[41] Pollutants from agricultural nonpoint sources include sediment, nutrients, salinity, thermal impacts, bacteria, and pesticides.

As with farms and ranches, forests cover a large portion of the State. Nearly a quarter of Montana's land area is forestlands (22.5 million acres).[42] In 2002, the forest products industry contributed $970 million to the State's economy.[43] The forestlands of Montana are also the headwaters for many rivers and streams. These provide some the West's best fishing as well as water for agriculture, recreation, drinking water, and many other uses. Forestry activities, however can lead to impairment of beneficial uses, such as aquatic life, because of increases or changes in sediment, nutrients, temperature, or habitat conditions. Activities such as road building, soil disturbance, and harvest unit management may generate pollutants or cause deleterious changes to water quality or aquatic or riparian habitats.

**NPS Agriculture & Forestry Strategy**

Montana's agriculture NPS pollution mitigation goals include: increasing implementation of agricultural Best Management Practices (BMPs); improving irrigation water management; and increasing BMP implementation on rangeland. Montana adopted "Agricultural BMPs for Control of Nonpoint Source Pollution" based on Montana Conservation Practice Standards from the Natural Resources Conservation Service's Technical Guide as a framework for implementing this strategy.[44, 45] Numerous federal and state agencies and programs provide technical assistance and financial incentives to implement these BMPs.

In addition to advocating agriculture BMPs, DEQ's TMDL Program allocates pollutant loads using a watershed approach wherever NPS pollutants impair a waterbody's beneficial uses. A watershed approach focuses on targeting priority water quality problems, promoting stakeholder involvement, integrating solutions that make use of the expertise and authority of multiple agencies, and measuring success through monitoring and data gathering. The Water Quality Restoration Plans developed as a result of the TMDL Planning efforts include an implementation strategy, which identifies critical steps toward restoring full support to beneficial uses.

Montana also has specific strategies for reducing NPS pollution resulting from forestry and forestry-related activities. Montana's NPS goal for forestry and forestry-related activities is to reduce water quality impacts associated with forest practices. Montana's water quality protection program for forestry and forestry-related activities relies on a combination of regulatory and voluntary approaches. The 1989 Montana legislature passed a law to provide forestry BMP information to private forest owners and operators to help protect water quality in Montana. This law requires private forest owners to provide the Forestry Division of the Department of Natural Resources and Conservation (DNRC) with their plans before they begin operations on a timber harvest. Since that time, a BMP Work Group has been reviewing and revising the original BMPs and providing statewide BMP audits on federal, state, and private forestry projects. Montana also has a Streamside Management Law (MCA 77-5-301 – 307), established in 1991, which provides regulatory standards for forest practices in riparian areas.

In the development of Water Quality Restoration Plans and TMDLs, DEQ develops allocations for all significant nonpoint, forestry-generated sources of pollution. The Water Quality Restoration Plans also provide implementation and monitoring strategies to encourage restoration of beneficial uses and tracking progress towards that goal.

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[40] Montana Department of Environmental Quality (US) [DEQ]. Water Quality Planning Bureau. 2004 Montana Water Quality Assessment Database [database online]. Helena (MT): DEQ; 2000. Available from: http://www.CWAIC.mt.gov. Accessed 2006 November 17.
[41] Ibid.
[42] Roger C. Connor and Renee A. O'Brien, *Montana's Forest Resources* (Ogden: Intermountain Research Station, USDA Forest Service Intermountain Research Station Resource Bulletin INT-81, 1993).
[43] *2004 Montana Agricultural Statistics* [online document] (Montana Department of Agriculture, Issn: 1095-7278, Vol. XLI). Available from: http://www.nass.usda.gov/mt/.
[44] 2005 electronic Field Office Technical Guide [online documents] (Natural Resource Conservation Service [cited 11/02/05]. Available from: http://efotg.nrcs.usda.gov/treemenuFS.aspx?Fips=30049&MenuName=menuMT.zip
[45] Montana Department of Environmental Quality (US) [DEQ]. 2004 Annual Report of Montana's Nonpoint Source Management Program [online document]. Helena, MT: DEQ; 2004. Available from: http://www.DEQ.mt.gov/wqinfo/nonpoint/2004AnnualReport.pdf. Accessed 2005 Nov. 02.

**Hydrologic Modification**

Hydrologic modification includes flow modification, and channel straightening, widening, deepening, clearing, or relocating existing stream channels. Flow regulation modification affects water temperature, sediment transport, dissolved oxygen, instream flows, and streambank stability. Temperature and flow changes may limit aquatic life and recreational uses downstream. Sources of flow modification include dams, weirs for irrigation and stock watering, undersized culverts, transportation embankments (rip rap), and off-channel constructed "water features" such as fishing ponds.

**NPS Hydrologic Modification Strategy**

The DEQ's goals for mitigating NPS pollution caused by hydrologic modification include: reducing the impacts of existing hydrologic modifications and assuring that new hydrologic modifications do not impair beneficial uses. Several state and federal laws regulate or otherwise address some of these impacts, such as the Montana Stream Protection Act, the Montana Floodplain and Floodway Act, the Montana Natural Streambed and Land Preservation Act, Montana Water Use Act (defines water rights and appropriations), Section 404 of the federal Clean Water Act, and Federal Reserved Water Rights. The NPS group within DEQ also focuses on:

- Including representatives of hydroelectric interests on local watershed advisory committees
- Working with local watershed groups to develop implementation goals and objectives and identify appropriate BMPs for flow related impairments.
- Reviewing permit applications, environmental impact statements and other appropriate documents for compliance with state water quality laws and standards.
- Encouraging approaches that cause the least impact when it is determined that hydrological modifications are in the public interest.
- Assessing the need for additional BMPs for hydromodifications.

**Resource Extraction**

Working mines are regulated with federal and state permits including point source discharge permits. In order to obtain a permit, mine operators have to post a bond covering liability for cleanup and restoration. However, abandoned and inactive mines are significant sources of nonpoint source pollution in many of Montana's watersheds. DEQ's Mine Waste Cleanup Bureau (MWCB) has designated 300 Priority Mine Sites.[46] The MWCB's activities focus on two primary site types: 1) inactive mine sites addressed under the Surface Mining Coal and Reclamation Act and 2) mining-related sites addressed under the federal Comprehensive Environmental Responsibility, Compensation, and Liability Act (Superfund sites). NPS impacts associated with resources extraction are related to excessive metals and/ or sediment, which can harm aquatic life and impair drinking water use. Montana has addressed many long-abandoned mine and mill sites; to date 283 projects have been completed.[47]

Much of eastern Montana lies atop coal beds that are potential sources of methane. Coal bed methane (CBM) extraction may impact water quality in several ways. These include increased flows from surface water discharges of groundwater, and changes in water chemistry including salinity, sodium absorption ratio, and total suspended solids. Salinity is a particular concern, as too much salt in irrigation water can inhibit plant growth and destroy soil productivity and even limit its use as stock water.

**NPS Resource Extraction Strategy**

The goals of the NPS Program are to mitigate damage from past mining activities and protect water quality from new mining developments. In addition, the NPS staff collaborate closely with the MWCB in developing TMDLs and water quality restoration plans for impacted watersheds. NPS and MWCB staff also coordinate review of draft point source permits for new mines to assure that the new permit is consistent with the water protection goals of both programs.

[46] 2005 Montana Priority Mine Sites [database online]. Helena, MT: Montana Department of Environmental Quality (US), Abandoned Mine Program. Available from: http://www.DEQ.state.mt.us/abandonedmines/priority.asp. Accessed 2005 June 30.
[47] Ibid.

The DEQ develops water quality standards to protect all appropriate beneficial uses. The standards include general prohibitions that require state waters to be "free from substances attributable to municipal, industrial, agricultural practices, or other discharges that will create concentrations or combinations of materials which are toxic or harmful to human, animal, plant or aquatic life" (ARM 17.30.637(1)). The DEQ has developed electrical conductivity and sodium absorption ratio standards for the Tongue, Powder, and Rosebud watersheds where most of the state's CBM resources are located. These standards are designed to protect existing and future beneficial uses from impacts associated with the discharge of high SAR and EC waters.

**Other Sources of Nonpoint Source Pollution**

**Construction**

Construction activities by their very nature disturb soils and create opportunities for erosion that can in turn increase sediment and nutrient loads to surface waters. Additionally, habitat alteration from construction activities (e.g. alteration or removal of riparian vegetation) can have significant negative impacts upon aquatic systems and life.

**NPS Construction Strategy**

The NPS Program's goal is to reduce water quality impacts of construction activities. MPDES general discharge permits require contractors to take measures to protect water quality of construction activities that disturb more than five acres of land. Construction activities that disturb more than one acre of ground within 100 feet of a river, lake, and stream must be permitted and engage in water quality protection actions. DEQ provides information and educational materials regarding both how construction activities can harm water resources, and what efforts and requirements contractors or private citizens can or must take to minimize impacts from this type of activity.

**Urban Runoff/Storm Sewers**

Stormwater runoff from urban and industrial areas is a significant source of pollutants such as oil and grease, pesticides and fertilizers, bacteria, and metals (e.g. lead, copper, zinc). In Montana, pollution from stormwater runoff is relatively localized due to the relatively low population density. Point source discharge permits for municipal storm sewer systems are currently required for seven urbanized areas and cities in Montana: Billings, Bozeman, Butte, Great Falls, Helena, Kalispell, and Missoula. Additionally, portions of Cascade, Yellowstone and Missoula Counties, the University of Montana, Montana State University, Malmstrom Air Force Base, and the Montana Department of Transportation, (within designated urbanized area that require permits) will receive discharge permits requiring six "Minimum Measures."

**NPS Urban Runoff/Storm Sewer Strategy**

Montana's NPS Program goal is to reduce stormwater impacts on water quality. In addition to storm sewer permits, the NPS Program uses watershed-based Water Quality Restoration Plans and TMDL development to address stormwater concerns. Additionally, DEQ encourages and supports local information and education campaigns to reduce the amount of pollutants that homeowners contribute to stormwater.

**Land Disposal**

Approximately 302,000 Montanans contribute waste to an estimated 121,000 household sewage disposal systems (i.e., on-site septic systems).[48] A well-constructed and maintained septic system in suitable soils does a good job of treating household wastes. However, poorly designed, or neglected systems may be sources of excess nutrients (especially nitrate) and pathogens. In some areas, septic systems are a significant water quality concern. Landfills, particularly unlined facilities, also pose a threat to surface and groundwater quality. Harmful and toxic substances may leach into the aquifer or surface waters.

[48] Estimation based on a State population size of 902,195 (2000 Census) individuals, of which approximately 600,000 use community-based sewer systems. For estimation purposes, the State assumes an average of 2.5 persons per household septic system.

#### NPS Land Disposal Strategy

The NPS Program addresses land disposal impacts on a watershed basis. Several water quality protection districts and watershed groups are confronting the individual sewage disposal problem, notably in the Helena, Bitterroot, Missoula, Flathead Lake, and Gallatin/Big Sky areas. DEQ assists local watershed groups identify appropriate BMPs where individual sewage disposal systems have been identified as a water quality concern. DEQ also develops source water protection plans for communities throughout the state that have site-specific source water concerns, such as land disposal contaminant issues and identifies BMPs that can be implemented to address those issues.

### Transportation

The State's transportation system contributes to nonpoint source pollution through runoff, atmospheric deposition of nitrogen oxides, flood plain and river channel encroachment, and construction activities. Sediment, nutrients, dissolved solids, metals, oil and grease, and habitat loss and degradation are all potential causes of NPS pollution related to transportation.

#### NPS Transportation Strategy

The NPS Program focuses on mitigating past transportation related impairments and reducing future impacts. DEQ collaborates with the Montana Department of Transportation (MDT) to mitigate and minimize water quality impacts resulting from the State's transportation system. Stormwater and 401 (wetland disturbance) permits for MDT-led projects are reviewed to ensure appropriate "avoid, minimize, mitigate" decisions and adequate attention to BMPs. Through the Water Quality Restoration/TMDL Planning process DEQ also evaluates transportation system pollutant –waterbody specific concerns to address significant causes of impairment.

### Atmospheric Deposition

The 2000, 303(d) list identifies atmospheric deposition as a probable source of impairment for three large lakes and reservoirs in Montana: Flathead Lake, Fort Peck Reservoir, and Holter Lake. These lakes total over 376,500 surface acres. Pollutants attributed to atmospheric deposition include nitrogen, phosphorus, mercury, and chemicals such as PCBs. Atmospheric deposition is a source that does not fit well in the watershed approach since sources are most likely removed from the affected waterbody. It is a state, regional, national, and international challenge that will require significant coordination beyond the state DEQ to resolve.

#### NPS Atmospheric Deposition Strategy

The NPS Program's goal is to develop a more complete understanding of atmospheric deposition impacts on water quality and recommend appropriate public policies. The NPS Program's strategy is to:

1. Characterize and quantify contributions of atmospheric deposition to pollution loads as part of source assessments for TMDL planning.
2. Work with DEQ Air Quality Monitoring Section to characterize and describe atmospheric deposition on impaired waterbodies.
3. In watersheds where atmospheric deposition is a significant source of a pollutant, and the specific sources cannot be identified or otherwise included in the plan, other load sources of the pollutant may be reduced to meet TMDL targets.
4. Report water quality impacts of atmospheric deposition to the Board of Environmental Review, the Environmental Quality Council, Environmental Protection Agency, and Montana's Congressional delegation.
5. Increase public awareness of the water quality impact and threat of atmospheric deposition through information/education activities.

**Contaminated Sediments from Industrial Activities**

Metals and long-lived organic pollutants from past mining-related activities, fuel spills, rail yards, wood treatment plants, and other industrial sources often accumulate in streambeds and lake sediments. These pollutants may be directly toxic to aquatic life and humans, or they may be concentrated in tissues of fish and higher animals that feed on fish or aquatic life. Through bioaccumulation, concentrations of these pollutants can reach levels that are harmful to the health of wildlife and humans.

**NPS Contaminated Sediments Strategy**

The NPS Program addresses contaminated sediments on a watershed or waterbody basis. Each source of contamination presents its own set of challenges. Removing and disposing of contaminated sediments is often expensive and creates risks and potentially other water quality impacts, such as dispersion downstream. As appropriate, the NPS program uses resources from DEQ's Remediation Division as well as other state and federal agencies to address clean up.

***Water Pollution Control Revolving Fund***

The Water Pollution Control State Revolving Fund (WPCSRF) program was established as a result of the 1987 Amendments to the Federal Clean Water Act that provided the authority for EPA to make capitalization grants to states. The grants, along with state matching funds, provide financial assistance for the construction of water pollution control projects.

The 1989 Montana State Legislature, under Title 75, Chapter 5, Part 11, Montana Code Annotated, passed the enabling legislation, entitled "Wastewater Treatment Revolving Fund Act," giving authority to the Montana DEQ and the DNRC to adopt administrative rules for implementing the program. Legislation also provided these Departments the ability to generate state match funds, through the sale of State General Obligation Bonds. In 1991, 1995, 1997, 1999, 2001, and 2003, the Montana legislature passed amendments to the Wastewater Treatment Revolving Fund Act. The 1997 amendments changed the title of the act from "Wastewater Treatment Revolving Fund Act" to the "WPCSRF" and added Nonpoint source projects to the eligible project definition.

The long-term goal of the WPCSRF is to maintain, restore, and enhance the chemical, physical, and biological integrity of the State's waters for the benefit of the overall environment and the protection of public health while maintaining a long-term, self-sustaining program.

Each year, the WPCSRF program prepares an Intended Use Plan (IUP)and Project Priority List (PPL). Projects are ranked for the PPL using several criteria including: impacts to water quality resulting from the current project situation, the likelihood of improving water quality (restoring designated uses) as a result of implementing the proposed project, pollution prevention efforts of the project sponsor, and readiness to proceed. The result is a relatively realistic prioritized list of eligible point and Nonpoint projects for which to use the funds.

The WPCSRF program has an estimated funding capacity of approximately $11 million per year for the next several years assuming a consistent federal capitalization effort. At this time, the supply of funds exceeds the demand for the funds. Therefore, the program funds all potential projects. The WPCSRF program has predominately funded municipal wastewater treatment and collection projects totaling approximately $155 million since the inception of the program in 1989. However, the program has also funded many Nonpoint source projects including agricultural BMPs, landfills, and stormwater projects totaling approximately $32 million throughout the program's history.

The WPCSRF program, with the use of EPA Sect.106 funds, also provides technical assistance to municipal wastewater treatment facilities around Montana. This assistance includes operation and maintenance inspections, as well as comprehensive performance evaluations to optimize treatment performance of these facilities. In addition, the program provides training of wastewater operators and technical assistance to engineers and the public in the area of wastewater treatment.

***Total Maximum Daily Load Program***

**TMDL Definition and Regulatory Requirements**

TMDL is the allowable loading from all sources (point, nonpoint and natural background) established at a level necessary to achieve compliance with applicable surface water quality standards (75-5-103 (32)). Montana State Law (MCA 75-5-703) directs the DEQ to develop TMDLs for impaired or threatened waterbodies[49], and TMDL development is also required for these waterbodies under the CWA. Montana Code specifically defines an impaired waterbody at MCA 75-5-103 (11) as, "…a waterbody or stream segment for which sufficient credible data shows that the waterbody or stream segment is failing to achieve compliance with applicable water quality standards." A threatened waterbody is defined at MCA 75-5-103 (31) as, "…a waterbody or stream segment for which sufficient credible data and calculated increases in loads show that the waterbody or stream segment is fully supporting its designated uses but threatened for a particular designated use because of (a) proposed sources that are not subject to pollution prevention or control actions required by a discharge permit, the nondegradation provisions, or reasonable land, soil, and water conservation practices; or (b) documented adverse pollution trends."

In a 2001 letter regarding the Big Creek TMDL, EPA described the distinction between "pollutants" and "pollution" within the TMDL process. In this letter, EPA noted that it only approves or disapproves TMDLs addressing *pollutant* impaired or threatened waterbodies. *Pollution* impairment or threats may be addressed within the TMDL document but are not considered in EPA's approval of the TMDL for a specific waterbody - pollutant combination. This EPA policy is reflected in the integrated reporting format which places pollutant impaired waterbodies in category 5; which EPA considers the 303(d) list. Waterbodies impaired or threatened only by *pollution* are placed in category 4C in the integrated reporting format. Examples of pollutants are metals such as arsenic and lead, nutrients such as total phosphorus and total nitrogen, sediment/siltation, and temperature. Examples of pollution are "alteration in stream-side or littoral vegetative covers", "low flow alterations", and "fish barriers (fish passage)."

**Program Overview**

The Watershed Management Section (WMS) within the Water Quality Planning Bureau is responsible for TMDL development for the state. The goals for the section include the development of TMDLs that are consistent in the application and interpretation of state water quality standards and state law, and the development of TMDLs at a pace consistent with court ordered schedules. The WMS also provides a linkage to TMDL implementation by including implementation strategies and recommendations in TMDL documents, thus facilitating the transition from TMDL development to TMDL implementation.

In Montana, TMDLs and watershed restoration plans are developed using a "watershed" approach. In this approach, TMDLs are developed for all streams impaired by a given pollutant or set of pollutants within a given watershed. The scale of the watershed used for TMDL development is based on USGS Hydrologic Unit Code (HUC - 4$^{th}$ code) boundaries where practical. These "watersheds" are called TMDL Planning Areas (TPAs) to distinguish the areas from USGS 4$^{th}$ code HUC watersheds.

A large percentage of waters within Montana have impairments that fall within the "pollution" category. WMS staff develop water quality plans that include TMDLs for waterbodies impaired by *pollutants* and additional restoration goals and objectives for waterbodies impaired by *pollution.* This allows staff to identify and pursue water quality improvements via a comprehensive planning process that typically addresses all situations where water quality standards are not attained within a watershed. The comprehensive document is often referred to as a watershed or water quality restoration plan that includes required TMDLs within its scope.

**TMDL Prioritization Process**

In response to a June 21, 2000 order from the United States District Court of Montana, DEQ and EPA published a schedule for the completion of all necessary TMDLs (published October 27, 2000). At the time of publication, the court mandated deadline for completion of all necessary TMDLs was May 5, 2007. A Settlement Agreement, dated November 18, 2004 resulted in an updated schedule whereby EPA and DEQ have until 2012 to complete all TMDLs described in the original suit with the exception of eight TPAs where TMDLs must be completed by 2007.

[49] The Clean Water Act refers to threatened and impaired waterbodies as "Water Quality Limited Segments".

While there are many factors that contribute to the prioritization for TMDL development, the overriding concern Montana faces is satisfying the terms of the court imposed schedule with critical dates in 2007 and 2012. Appendix illustrates the TMDL prioritization schedule on a TPA basis. At present, high priority is assigned exclusively to the TPAs required to be completed by 2007 under the Settlement Agreement. As shown in the list below, all but three of the high priority TMDLs have already been completed and approved. The remaining three (St. Regis, Middle Blackfoot, and Yaak) are scheduled for completion in 2006/2007

- Blackfoot Headwaters
  - Metals approved in 2003
  - Sediment approved in 2004
- Flathead Headwaters
  - Approved in 2005
- Ninemile
  - Approved in 2005
- Bitterroot Headwaters
  - Approved in 2006
- Swan
  - Approved in 2004
- St. Regis
  - Scheduled for 2007
- Middle Blackfoot
  - Scheduled for 2006/2007
- Yaak
  - Scheduled for 2007

Medium priority is assigned to those waterbody – pollutant combinations originally listed in 1996 that are still in need of TMDL development, and must be completed by 2012 in accordance with the Settlement Agreement. A low priority is assigned to those waterbody – pollutant combinations that have been added to Montana's 303(d) list since 1996.

The TMDL schedule depicted in Appendix F is based on DEQ's most recent annual TMDL work planning session that is typically conducted in January. Each year, a revised TMDL schedule is prepared, presenting target completion dates for the current year and subsequent two years. Prioritization factors considered during DEQ's annual TMDL work planning session include:

- Stakeholder Interest. TMDL development has historically focused on areas where there is significant stakeholder interest. DEQ recognizes that there is a benefit to having TMDLs completed in areas where stakeholders will use the TMDL and water quality restoration planning process to help guide and assist with locally led water quality implementation activities.

- Funding Availability. Section 319 NPS program funds from EPA have been a major source of funding for TMDL development, and TMDL development has focused on TPAs where 319 funding can be used. These areas tend to have high stakeholder interest as defined above.

- Significant New Pollutant Sources. There are many areas with water quality problems or concerns linked to significant population growth or proposed development such as CBM. The opportunity to address these water quality problems or concerns through a water quality planning process such as TMDL development makes this an important criterion for scheduling TPAs.

- Linkage to Discharge Permits. Pollutant levels within a MPDES permit comprise a portion of the TMDL allocation. Therefore, TMDL development at a watershed scale is a critical component to help determine appropriate permit requirements. This is particularly true when new permits are proposed or permits are being renewed. This criterion is often linked to the New Pollutant Sources criterion above.

- Upstream to Downstream Staging. Upstream watershed TMDL development often is necessary to facilitate TMDL development within downstream watersheds. Therefore, TPAs in headwaters areas are often scheduled in advance of downstream areas.

- Data Availability. Work is often focused in areas where there is existing knowledge to help facilitate TMDL development and where data can be readily obtained via waterbody access. Existing knowledge includes available reference data, knowledge of aquatic resource and pollutant impacts, source loading data, and data about existing waterbody conditions and capabilities. For this reason, TMDL development is currently focused more in the western part of Montana and/or for the TPAs where waterbodies have cold water fish classifications.

- Existing Resource Commitments. TPAs with significant effort already completed toward TMDL development tend to have higher priority over areas where very little TMDL development has yet occurred.

- Additional Factors. Additional Factors apply when the above criteria either do~~es~~ not apply or have similar applicability to a given TPA. These additional factors include the number of TMDLs within the watershed, the ability to correct existing problems, the importance of water quality to local economies, and the ability to positively impact native species.

**Looking Forward**

The WQPB is committed to a system of continuous process improvement. Bureau staff are working with EPA to develop, refine, and implement programmatic foundational elements. These foundational elements, once implemented, will expedite bureau function and efficiency, increasing the overall quality and production rate of TMDLs and related water quality planning elements. The second phase of foundational element implementation will be complete at the beginning of 2008.

Examples of these foundational elements include

- Improved data management, analysis, and reporting systems,
- Improved water quality standards interpretations,
- Consistent stream monitoring procedures,
- Improved biological metrics,
- Expansion of reference data sets,
- Consistent source assessment methods including expanded modeling applications,
- Increased use of templates and standardized document language, and
- Improved planning process focused on implementation of applicable quality assurance components.

The current pace for EPA approved TMDLs is approximately 50 to 100 waterbody - pollutant combinations per year, within three to five TPAs. This pace is expected to significantly increase following implementation of the second phase of programmatic foundational elements.

**B.3 Cost/Benefit Assessment**

Section 305(b) of the CWA "requires states to report on the economic and social benefits of actions necessary to achieve the objective of the CWA."[50] Several State, Federal, and private entities implement water quality, improvement efforts in the State. As such, the information on the costs associated with these efforts is complex and not readily available for preparing a comprehensive cost-benefit assessment. The following provides a summary of the program costs and benefits associated primarily with the DEQ's Point and Nonpoint source efforts.

***Montana Point Source Costs***

From 2001 to 2004, the State of Montana spent roughly $137.7 million on municipal wastewater treatment and collection system construction. This translates to an average of $34.4 million spent per year over this four-year

[50] U.S. EPA. 1997. Guidelines for the Preparation of the Comprehensive State Water Quality Assessments (305(b) Reports) and Electronic Updates. U.S. Environmental Protection Agency, Washington D.C.

period for addressing point source pollution.[51] This figure includes money spent by all funding agencies in the state and some federal programs.

Included in this $34.4 million is money spent within the WPCSRF administered by DEQ. Capitalization grants the State receives from the EPA (CWA Section 106 federal funds) for the WPCSRF, along with state matching funds provide financial assistance for water-pollution-control projects that mostly target point sources. In addition, the program provides training of wastewater operators and technical assistance to engineers and the public in the area of wastewater treatment.

Since 1991, the WPCSRF program has predominately funded municipal wastewater treatment and collection projects totaling approximately $155 million. This averages to about $11 million per year, which is a part of the $34.4 million annual figure for all point source costs. Thus, WPCSRF funding makes up about a third of the total funding for addressing point sources in the state. The WPCSRF program will have an estimated funding capacity of approximately $11 million per year for the next several years if EPA 106 funding remains consistent.[52]

***Costs of Montana's Nonpoint Source Program***

Most of Montana's NPS program budget comes from the federal government. CWA Section 319 federal funds, provided by the EPA as a grant to the State, pay 60 percent of NPS project grants and DEQ's NPS program cost. During the 2004 grant cycle, DEQ received proposals totaling $4.7 million dollars. Out of this amount, the DEQ awarded $1.85 million to 19 watershed projects and four information and education projects. In the 2005 grant cycle, DEQ received requests for $2.9 million of which DEQ was able to award $1.4 million to 20 projects throughout Montana. The average annual amount of 319 funds spent in Montana from 1995 to 2004 was about $1.75 million.

In the past, 319 grants were largely awarded to watershed restoration projects rather than TMDL or watershed planning projects.[53] For example, between 1995 and 2001, about 80% of all 319 money went to implementation and only 10% went to TMDL. Today, the DEQ takes a more directed management approach to awarding 319 grants. The DEQ now emphasizes the development of plans that will clearly identify causes and sources of impairments and potential strategies for mitigating these impacts on affected State waters prior to funding their restoration. As a result, a majority of the money currently awarded from these funds is for TMDL or watershed restoration planning projects. In fact, from 2002 through 2004 the DEQ awarded about 80% of their 319 money to TMDL development. Since 2002, about half of all TMDL projects that were funded are complete.[54]

In addition to an average of $1.75 million a year for project grants, DEQ receives about $1.3 million per year for staffing and support for an average yearly 319 fund total of $3.1 million. Over the past three years, the DEQ has been receiving between $2.6 and $3.0 million per year in 319 funds for staffing and support and projects grants. When DEQ's 40% share is added to this figure, the average total amount of money spent on the NPS program over the last 3 years has been about $4.5 million per year. In state FY05, DEQ received $2,655,700 in total 319 funds, and with DEQ's share spent about $4,426,200 total on NPS programs. Compared to recent years, approximately $500,000 has been cut from EPA's Montana appropriation for FY05. The DEQ expects funds in FY06 to be about the same as in FY05, although the U.S. Congress has yet to approve a specific amount.

The WPCSRF program mentioned above has also funded many Nonpoint source projects including agricultural BMP, landfills, and storm water projects totaling approximately $32 million since 1991 or about $2.3 million per year on average.

[51] Lavigne, P. 2005. Personal communication. Montana Department of Environmental Quality, Helena, MT.
[52] Lavigne, P. 2005. Personal communication. Montana Department of Environmental Quality, Helena, MT.
[53] Rung, R. 2005. NPS/319 Funds Breakout 1990-2004. Montana Department of Environmental Quality, Helena, MT.
[54] Yashan, D. 2005. Personal communication. Estimates on TMDL funding and status. Montana Department of Environmental Quality, Helena, MT.

***Summary of Montana's Clean Water Costs***

The average annual cost for Montana's Point and NPS pollution programs is approximately $41.2 million (Table 8). This figure, however, does not include the costs associated with the State's enforcement, permitting, or public drinking water programs, which are quite small compared to the total costs.

**Table 8. Summary of Average Annual Costs for CWA Programs (1991 – 2004)**

| Activity | Total (Millions of Dollars) |
|---|---|
| **Nonpoint source control programs** | **6.8** |
| NPS Program | |
| Staffing and Support | 1.3 |
| Restoration, Planning, and Information/Education Projects | 3.2 |
| WPCSRF NPS funds | 2.3 |
| **Point Source control programs** | **34.4** |
| WPCSRF | 11.0 |
| *Other State and Federal Agency Programs* | 23.4 |

***Benefits of Complying with the CWA in Montana***

The benefits of maintaining and improving the quality of the state's waters through the CWA include the following:

- Preserving or improving the quality of the state's water-related recreational activities including both commercial and non-commercial boating, water skiing, swimming, whitewater rafting, and river floating. In addition, one of the most popular and income generating water-related activities in Montana is fishing. The state waters of Montana include several Blue Ribbon Trout Rivers and streams, which benefit from high-level water quality;
- The ecological value of protecting aquatic wildlife including several species of fish that are listed as endangered or threatened;
- The ecological and economic values of protecting aquatic and associated terrestrial habitats that rely on high-quality waters;
- Protecting the quality of water for industrial, commercial, and municipal uses thereby reducing or eliminating the cost of treatment;
- Preserving or improving the quality of water for states downstream of Montana river flows.

**Point Source Benefits**

The long-term goal (or benefit) of the WPCSRF is to maintain, restore, and enhance the chemical, physical, and biological integrity of the State's waters for the benefit of the overall environment and the protection of public health while maintaining a long-term, self-sustaining program. The WPCSRF program, with the use of EPA 106 funds, also provides technical assistance to municipal wastewater treatment facilities around Montana. This assistance includes operation and maintenance inspections and comprehensive performance evaluations to optimize treatment performance of these facilities.[55]

The beneficial economic impacts of Montana's WPCSRF loan program on water quality and public health (since its inception in 1991) can be summarized as follows:

- Upgraded, expanded, or replaced 40 inadequate wastewater treatment lagoon systems for the benefit of better water quality in the various state waters those lagoons empty into
- Upgraded, expanded, or replaced nine public wastewater plants

[55] LaVigne, P. 2005. Personal Communication. Montana Department of Environmental Quality, Helena, MT.

- Improved water quality and reduced operating expenses at 21 projects related to municipal wastewater plants by reducing infiltration and inflow in the collection systems and by replacing leaky pipes that allow stormwater runoff or groundwater to enter the system
- Improved groundwater quality and addressed potential public health hazards by eliminating septic systems with community collection and treatment systems on 25 projects. Improved groundwater quality leads to better quality well water that can be used for various activities such as municipal water supply and irrigation
- Reduced nutrient loading to state waters by constructing eight nutrient removal treatment systems helping to maintain or improve those waters for their beneficial designated uses
- Protected water quality by funding approximately 315 nonpoint source projects helping state waters maintain or improve their capacity for designated uses.

Havre in Northern Montana is one city that has benefited from the State's point source programs. Havre is using Drinking Water State Revolving Fund money to (1) identify and manage water quality issues (e.g., turbidity) related to the city's drinking water sources and (2) upgrade its treatment plant. The upgrade will help address Havre's source water turbidity problems and will protect the investment in the plant upgrade.[56]

**Nonpoint Source Benefits**

In 2004, the DEQ Water Quality Planning Bureau, Watershed Management Section focused on implementing the State's NPS Pollution Management Plan and approved TMDLs. The Watershed Management Section also continued working on TMDL/water quality restoration plans on a watershed basis. Highlights of work completed to date include:

- During 2004, water quality restoration plans (including 27 TMDLs) were submitted to EPA for approval for three TMDL planning areas:
  - Blackfoot Headwaters
  - Swan
  - Sun
- As of 2003, water quality restoration plans were completed and approved by EPA for the following TMDL Planning Areas (# of TMDLs in parenthesis):
  - Deep Creek (1)
  - Elk Creek (1)
  - Lone Tree Creek (1)
  - Careless Creek (1)
  - Flathead Lake (2)
  - Big Sandy Creek (3)
  - Sage Creek (6)
  - Cooke City (39)
  - Big Creek in the Columbia Basin (1)
  - Blackfoot Headwaters (29)
  - Teton River (11)
- Two watersheds did not require a TMDL, but water quality restoration plans were prepared to address pollution issues:
  - Lower Musselshell

[56] Source: City of Havre Public Water System, Source Water Delineation and Assessment Report, September 13, 2000. Available from: http://www.DEQ.state.mt.us/ppa/swp/nrisreports/MT0000524.htm.

- Big Creek in the Yellowstone

- DEQ and EPA have completely addressed about 220 individual, waterbody – pollutant combinations via the TMDL and associated data collection and review process through 2004.
- The Water Quality Monitoring Section finished field sampling of 193 waterbody segments and completed beneficial use support assessments for 20% of the waterbody segments on the 2000 reassessment list.
- The Board of Environmental Review (BER) adopted new classifications and standards for waterbodies that are dry during a significant portion of the year and low flow streams. The BER also adopted new standards for pathogens (*E. coli*) and Arsenic
- The National Center for Appropriate Technology (NCAT) completed a NPS 319 project: *A Watershed Approach to Better Irrigation Management.* The NCAT 319 project addressed two objectives of the NPS Management Plan: 1) improve irrigation water management and 2) increase application of BMPs for irrigated agriculture. The NCAT project targeted the Jefferson, Big Hole, and Blackfoot watersheds. The project helped local watershed groups develop and run their own low cost irrigation management programs. The project also provided a way to reliably monitor irrigation efficiency so that water and energy savings could be quantified. Using the Environmental Quality Incentives Program to provide technical and financial assistance, the landowners within the upper Big Hole River watershed planned and implemented conservation practices that will decrease the amount of water diverted from the river. Fifteen agricultural producers will implement the following practices on 15,848 acres: Irrigation will be shut off during the summer using a staggered schedule and twelve off-site watering facilities will provide an alternative source to watering stock on the Big Hole River. This successful program may soon add three additional landowners.
- The Forestry BMP Audit, with an audit team, coordinated by the Montana Department of Natural Resources and Conservation's Forestry Division, evaluated thirty-nine timber harvest sites on public and private lands. Audit results showed that across all ownerships, BMPs were properly applied 97 percent of the time. Audit results also showed that across all ownerships, BMPs were effective in protecting resources 99 percent of the time.
- Specific examples of benefits from water quality restoration and TMDL development are:
  - The Middle Blackfoot Watershed. This watershed, as a result of its Habitat and Water Quality Restoration Project, experienced an estimated load reduction of 16.8-lbs/year nitrogen, 5.7-lbs/year phosphorus, and 7,235-lbs/year sediment. These numbers are based on STEPL modeling and in-stream source reduction estimates.[57]
  - The annual load reduction achieved by the implementation of the Middle Milk River Demonstration Project is estimated 540 lbs/year nitrogen, 200-lbs/year phosphorus, and 5.5-tons/year sediment. To achieve this load reduction, a filter strip was installed adjacent to cropland, while a CAFO had to install a diversion and filter strip.[58]
  - The Goat Creek TMDL is a 33% reduction in suspended sediment during peak runoff.
  - The Jim Creek TMDL is a 10% reduction in fine sediment in gravels where fish spawn.
- The Swan Lake TMDL calls for no increase in particulate organic carbon and nutrients. These substances have a direct effect on oxygen levels in the lower levels of the lake and can eventually affect overall water quality in the lake.

[57] Middle Blackfoot River Load Reduction Report-March 2, 2005

[58] Flynn, K.F. and Smith, J., 2005. Middle Milk River Load Reduction Report-Draft Jan 20, 2005. Montana Department of Environmental Quality, Data Management Section, Water Quality Planning Bureau. Helena, MT.